

**WE CLAIM:**

1. A process to produce a slurry product, said process comprising  
removing impurities from a crude carboxylic acid slurry in a solid-  
liquid displacement zone to form said slurry product; wherein there is  
a substantial absence of terephthalic acid and isophthalic acid in said  
crude carboxylic acid slurry.
2. The process according to claim 1 wherein said solid-liquid  
displacement zone comprises a solid-liquid separator that is  
operated at a temperature between about 50 °C to about 200 °C.
3. The process according to claim 1 wherein said solid-liquid  
displacement zone comprises a solid-liquid separator that is  
operated at a temperature between about 140 °C to about 170 °C.
4. The process according to claim 2 wherein said solid-liquid  
displacement zone comprises a solid-liquid separator that is  
operated at a pressure between about 30 psig to about 200 psig.
5. The process according to claim 1 wherein said solid-liquid  
displacement zone comprises a decanter centrifuge.
6. The process according to claim 1 wherein said solid-liquid  
displacement zone comprises a solid-liquid separator selected from  
the group consisting of a belt filter, a rotary vacuum filter and a rotary  
disk pack centrifuge.

7. The process according to claim 1 wherein said solid-liquid displacement zone is operated at a pressure of less than about 100 psia.
8. The process according to claim 1 wherein said solid-liquid displacement zone is operated in continuous mode.
- 5 9. The process according to claim 1 wherein said slurry product is formed without hydrogenation.
10. A process to produce a purified carboxylic acid product said process comprising:
  - 10 (a) removing impurities from a crude carboxylic acid slurry in a solid-liquid displacement zone to form a slurry product; wherein there is a substantial absence of terephthalic acid and isophthalic acid in said crude carboxylic acid slurry;
  - (b) oxidizing said slurry product in a staged oxidation zone to form a staged oxidation product;
  - 15 (c) crystallizing said staged oxidation product in a crystallization zone to form a crystallized product.
11. The process according to claim 10 further comprising cooling said crystallized product in a cooling zone to form a cooled purified carboxylic acid slurry.
- 20 12. The process according to claim 11 further comprising filtering and optionally drying said cooled purified carboxylic slurry in a filtration and drying zone to remove a portion of the solvent from said cooled

carboxylic acid slurry to produce said purified carboxylic acid product.

13. The process according to claim 10, 11 or 12 wherein said solid-liquid displacement zone comprises a solid-liquid separator that is  
5 operated at a temperature between about 50 °C to about 200 °C.
14. The process according to claim 10, 11, or 12 wherein said crude carboxylic acid slurry comprises terephthalic acid, catalyst, acetic acid, and impurities that is withdrawn at a temperature between about 110°C to about 200°C from the primary oxidation zone.
- 10 15. The process according to claim 12 wherein said solid-liquid displacement zone comprises a solid-liquid separator selected from the group consisting of a belt filter, a rotary vacuum filter and a rotary disk pack centrifuge.
16. The process according to claim 12 wherein said purified slurry is  
15 formed without hydrogenation.
17. The process according to claim 15 wherein said purified slurry product has a b\* of less than about 4.5.
18. The process according to claim 14 wherein said catalyst comprises cobalt, manganese and bromine compounds.
- 20 19. The process according to claim 18 wherein the cobalt and manganese combined is present in concentrations of about 150 ppm to about 3200 ppm by weight in the crude carboxylic acid slurry and

the bromine can be in concentrations of about 10 ppm to about 5000 ppm by weight in the crude carboxylic acid slurry.

20. A process to produce a purified carboxylic acid product comprising:

(a) removing in a solid-liquid displacement zone impurities from a crude carboxylic acid slurry to form a slurry product; wherein said crude carboxylic acid slurry comprises terephthalic acid, catalyst, acetic acid, and impurities that is withdrawn at a temperature between about 140°C and about 170°C from the oxidation of paraxylene in a primary oxidation zone; wherein there is a substantial absence of terephthalic acid and isophthalic acid in said crude carboxylic acid slurry;

(b) oxidizing said slurry product in a staged oxidation zone to form a staged oxidation product; wherein said oxidizing is conducted at a temperature between about 190°C to about 280 °C; and wherein said oxidizing is at a higher temperature in said staged oxidation zone than in said primary oxidation zone;

(c) crystallizing said staged oxidation product in a crystallization zone to form a crystallized product;

(d) cooling said crystallized product in a cooling zone to form a cooled purified carboxylic acid slurry; and

(e) filtering and optionally drying said cooled purified carboxylic slurry in a filtration and drying zone to remove a portion of the

solvent from said cooled carboxylic acid slurry to produce said purified carboxylic acid product.

21. A process to produce a purified carboxylic acid product comprising:

(a) oxidizing an aromatic feed stock in a primary oxidation zone to form a crude carboxylic acid slurry; wherein said crude carboxylic acid slurry comprises terephthalic acid; wherein said oxidizing is conducted at a temperature between about 120°C to about 200 °C; wherein there is a substantial absence of terephthalic acid and isophthalic acid in said crude carboxylic acid slurry;

5 (b) removing in a solid-liquid displacement zone impurities from a crude carboxylic acid slurry to form a slurry product; wherein said crude carboxylic acid slurry comprises terephthalic acid, catalyst, acetic acid, and impurities that is withdrawn at a temperature between about 140°C and about 170°C from the oxidation of

10 paraxylene in a primary oxidation zone;

15 (c) oxidizing said slurry product in a staged oxidation zone to form a staged oxidation product; wherein said oxidizing is conducted at a temperature between about 190°C to about 280 °C; and wherein said oxidizing is at a higher temperature in said staged oxidation

20 zone than in said primary oxidation zone;

(d) crystallizing said staged oxidation product in a crystallization zone to form a crystallized product;

- (e) cooling said crystallized product in a cooling zone to form a cooled purified carboxylic acid slurry; and
  - (f) filtering and optionally drying said cooled purified carboxylic slurry in a filtration and drying zone to remove a portion of the solvent from said cooled carboxylic acid slurry to produce said purified carboxylic acid product.
- 5           22. The process according to claim 20 or 21 further comprising decolorizing in a reactor zone said purified carboxylic acid slurry or a carboxylic acid that has been esterified.
- 10          23. The process according to claim 22 wherein said decolorizing is accomplished by reacting said crude carboxylic acid solution with hydrogen in the presence of a hydrogenation catalyst in a reactor zone to produce a decolorized carboxylic acid solution.
- 15          24. The process according to claim 20 or 21 wherein said solid-liquid displacement zone comprises a solid-liquid separator that is operated at a temperature between about 50 °C to about 200 °C.
- 20          25. The process according to claim 20 or 21 wherein said purified slurry product has a b\* of less than about 4.5.
- 25          26. The process according to claim 21 wherein said catalyst comprises cobalt, manganese and bromine compounds.
- 30          27. The process according to claim 26 wherein the cobalt and manganese combined is present in concentrations of about 1050 ppm to about 2700 ppm by weight in the crude carboxylic acid slurry

and the bromine can be in concentrations of about 1000 ppm to about 2500 ppm by weight in the crude carboxylic acid slurry.

28. The process according to claim 1, 10, 19, 20 or 21 wherein said crude carboxylic acid slurry comprises terephthalic acid.
- 5      29. A slurry product produced by the process in claim 21.
30. A staged oxidation product produced by the process of claim 21.
31. A crystallized product produced by the process of claim 21.